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A Simple Dual Decomposition Method for Resource Allocation in Telecommunication Networks

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Abstract

© 2016 The Authors, published by EDP Sciences.We consider a problem of optimal resource allocation in a wireless communication network divided into zones (clusters). The network manager aims to distribute some homogeneous resource (bandwidth) among users of several zones in order to maximize the total network profit, which takes into account payments from users and implementation costs. As a result, we obtain a convex optimization problem involving capacity and balance constraints. By using the dual Lagrangian method with respect to the capacity constraint, we reduce the initial problem to a suitable one-dimensional problem, so that calculation of its cost function value leads to independent solution of zonal problems, treated as two-side auction models with one trader. We show that solution of each zonal problem can be found exactly by a simple arrangement type algorithm even in the case where the trader price is not fixed. Besides, we suggest ways to adjust the basic problem to the case of moving nodes. Some results of computational experiments confirm the applicability of the new method.

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